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ULTRAFAST ALL-OPTICAL SWITCH USING CARBON NANOTUBE POLYMER COMPOSITES

ABSTRACT

An ultrafast all-optical nonlinear switch. The switch has as components a substrate and a material disposed on the substrate. In one embodiment, the material includes a plurality of single-walled carbon nanotubes and a polymer forming a composite. Preferably, the polymer is polyimide. In another embodiment, the material includes a plurality of single-walled carbon nanotubes incorporated into a silica. The nanotube loading in the material is less than about 0.1 wt %. The material is a substantially transparent, third-order nonlinear optical material. The switch has a switching speed of less than 1 picosecond for light with a wavelength of about 1.55 micrometers. Also disclosed is a process for preparing the ultrafast all-optical nonlinear switch.

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